CAN OPENER

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SUPERVISOR'S DECLARATION

"I hereby declare that I have checked this project report and in my opinion this project is satisfactory in terms of scope and quality for the award of the degree of Diploma of Mechanical Engineering"

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Date : 23 NOVEMBER 2009

STUDENT'S DECLARATION

I declare that the work in this report is my own except for quotations and summaries which have been duly acknowledged. The report has not been accepted for any diploma and is not concurrently submitted for the award of the degree of Diploma of Mechanical Engineering.

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ABSTRACT

This report will present about the can opener. The can opener is a device that will use to open the metal can especially for the sardine can, food can and also milk can. Most cans have identical and parallel round tops and bottoms with vertical sides. The idea of fabricate of this can opener based on student creativity. This can opener will be fabricating with have the frame body that will combine with clamper to clamp the tin can. In the fabrication, there are many process involve to develop the product such as drilling, grinding, joining, measuring, gathering material, cutting material, and finishing process. This project is about design and fabricates a new product of can opener that has safety to user and more stable when it cut the metal can. Material are be used to fabrication of the can opener is a mild steel and stainless steel. In this report also that will more focus about the fabrication of this can opener.

ABSTRAK

Laporan ini membentangkan tentang pembuka tin. Pembuka tin ialah satu alat yang digunakan untuk membuka besi tin khususnya untuk tin sardine, tin makanan dan juga tin susu. Kebanyakan tin mempunyai permukaan bulat yang selari di permukaan atas dan juga dipermukaan bawah dengan sebelah tepi yang tegak.Idea pembentukan pembuka tin ini berdasarkan kreativiti pelajar sendiri. Pembuka tin ini akan dibentuk dengan mempunyai rangka badan yang digabungkan dengan pemegang untuk memegang tin. Dalam pembentukan pembuka tin ini, terdapat banyak process yang dilakukan seperti gerudi, megisar, menyambung, mengukur, mengumpul bahan, memotong bahan dan mencantikan produk. Project ini bertujuan untuk menghasilkan pembuka tin yang baru yang selamat digunakan oleh pengguna dan mempunyai kestabilan semasa ingin memotong besi tin. Bahan yang digunakan untuk membentuk pembuka tin ini ialah jenis “mild steel” dan juga jenis “stainless steel”. Dalam laporan ini juga akan lebih memfokuskan tentang pembentukan pembuka tin ini.

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LIST OF SYMBOLS

σ	Yield Strength ( )
	Area of hollow steel ( )
	Pressure that applied on the hollow steel (*N*)
m	Mass (*kg*)
	Concentrated force (*N*)
m	Distance (m)
N	Newton

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LIST OF ABBREVIATIONS

MIG	Metal Inert Gas Welding
PPE	Personal Protective Equipment
SMAW	Shielded metal arc welding
OXY	Oxyacetylene
GMAW	Gas Metal Arc Welding
DC	Direct Current
EP	Electrode Positive

CHAPTER 1

INTRODUCTION

The project involves designing and fabricating a Can Opener. A can opener (also known as a tin opener) is a device used to open metal cans. Basically the can opener could be divided into three stages, which are concept safety, designing and fabrication.

The can opener is equipped by using material which include, rectangular plate steel, round hollow steel, and rectangular hollow steel in manufacturing process by perform MIG welding to joint the parts and etc. The advantages of the proposed can opener to be developed can be seen to be open the metal can such as food can and milk can.

1.1 PROBLEM STATEMENT

As we know many type of can opener already have in the market and it almost have in one-handed product. However certain of product not safety for user especially about the blade and puncher. It is unsafe because the blade and puncher freely exposed to open the food or milk can in safety condition and also for convenience.

1.2 PROJECT SCOPE OF WORK

i. Sketching and designing can opener using Solidwork software.
ii. Fabricate and produce the can opener by using all necessary manufacturing process such as welding, cutting, grinding and etc.

1.3 PROJECT OBJECTIVES

The project objectives are to design and to fabricate a can opener:

i. That is suite to its application especially for open metal can.
ii. More safety for user.

1.4 ORGANIZATION OF THE THESIS

This thesis consists of five chapters that will explain each of part of the project. Chapter one will briefly explain about the objective of project, problem statement, and scope of this project.

Chapter two will explains about the can opener, type of can opener, tin can, and material of tin can and fabrication of tin can. Chapter three is the methodology of developing the application, it also details about the design of product, bill of material and all fabrication process.

Chapter four will explain about the analysis product such as cost analysis and stress analysis and for the chapter five or also the last chapter in this thesis will cover about the conclusion of the project and will also carry out the recommendation to improve the product in the future.

1.5 CONCLUSION

As a conclusion, objective and the scope already clear to develop the project base the problem statement and can continue to go for the next step on this project.

CHAPTER 2

LITERATURE REVIEW

The can opener is a mechanism that allowed people to open the metal can to take the something inside the tin such as milk can, food can and sardine can. It's help man to make easy to open the metal can without get the injury and it is more safety than using the knife or something like screw driver. It is design as kitchen utensils and only suitable to open the metal can.

2.1 CAN OPENER

A can opener also known as a tin opener is a device used to open metal cans. Although preservation of food using tin cans had been practiced since at least 1772 in the Netherlands, the first can opener was patented only in 1855 in England and in 1858 in United States. Those openers were basically variations of a knife and the 1855 design is still being produced. The first opener employing a now familiar sharp rotating wheel which runs around the can's rim cutting the lid was invented in 1870 but was difficult to operate. A breakthrough came in 1925 when a second serrated wheel was added to hold the cutting wheel on the rim. This easy to use design has become one of the most popular can opener models.

Around the time World War II several can openers were developed for military use such as P-38 and P-51. That opener featured robust and simple design where a folding knife and absence of a handle significantly reduced the opener size. Electric can openers were introduced in the late 1950s and were met with success. The development of the new can opener types continues nowadays with a recent example being a side cutting model.

2.2 TYPE OF CAN OPENER

2.2.1 Lever type Can Opener

Dedicated can openers appeared only in the 1850 and they were of primitive claw-shaped or lever-type design shown in the figure 2.1. Robert Yates, a cutler and surgical instrument maker of Trafalgar Place West, Hackney Road had patented the first can opener on 13 July 1855. His cutter incorporated a lever knife for cutting or ripping open preserved provision cases and other uses. It has a familiar construction with a curved blade and a projection with shoulders forming and efficient bearing or fulcrum in use. This robust design survived until present day.

In 1858, another lever type opener of more complex shape has been patented in US by Ezra Warner of Waterbury. It consisted of a sharp sickle which was pushed into the can and sawed its lid around the edge. A guard kept the sickle from penetrating too far into the can. The opener consisted of several parts which could be replaced if worn out, especially the sickle.

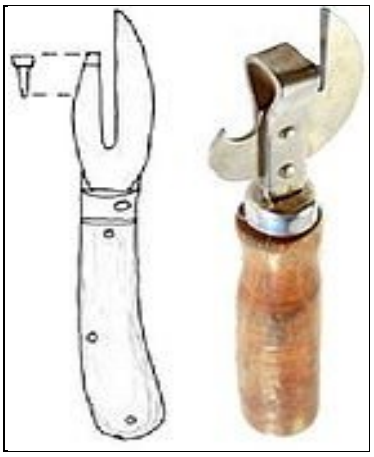

Figure 2.1: lever type can opener design of 1855 by Robert Yates

Source: Wikipedia, the free encyclopedia (2009)

2.2.2 Rotating Wheel Opener

The first rotating wheel can opener shown in the figure 2.2 was patented in July 1870 by William Lyman and produced by the firm Baumgarten in the 1890. The can was to be pierced in its canter with the sharp metal rod of the opener. Then the length of the lever had to be adjusted to fit the can size and the lever fixed with the wingnut. Thetop of the can was cut by pressing the cutting wheel into the can near the edge and rotating it along the can's rim.

The necessity to pierce the can first was nuisance, and this can opener design has not survived till present day. In 1925, the Star Can Opener Company had improved the Lyman's design by adding a second toothed wheel called "feed wheel" which allowed a firm grip of the can edge. This addition was so efficient that the design has been adopted until present day.

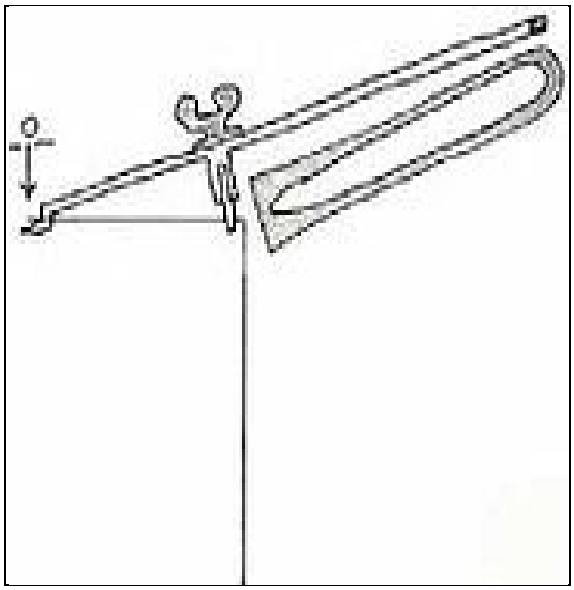

Figure 2.2: The rotary can opener of 1870 by William Layman

Source: Wikipedia, the free encyclopedia (2009)

2.2.3 Church Key

Initially referred to a simple hand-operated device for prying the cap of glass bottle. This kind of closure was invented in 1892 so as the Church key. The shape and design of some of these openers did resemble a large simple key. In 1935, beer can with flat tops were marketed and a device to puncture the lids was needed. The same church key opener was used to piercing those can. It was made from a single piece of pressed metal with a pointed end used for that depicted operating instruction on the cans themselves. The church key opener is still being produced usually as an attachment to another opener for example a “butterfly” opener is often a combination of the church key and a serrated-wheel opener.

Figure 2.3: A modern butterfly opener which combines a serrated wheel and a church key.

Source: Wikipedia, the free encyclopedia (2009)

2.2.4 Military can opener

Can opener with a simple design shown in the figure 2.4 and robust design had been specifically developed for military use. The P-38 and P-51 are small can opener with a cutter hinged to the main body. Also known as John Wayne because the actor was shown in a training film opening a can of K-rations. The P-38 can opener is keychain sized about 1.5 inches, 38 mm in length and consist of a short metal blade that serves as a handle and can also be used a screwdriver with a small, higher metal tooth that folds out to pierce the can lid. A notch just under the hinge points keeps the opener hooked around the rim of the can as the device is walked around to cut the lid out. A larger version called P-51 is somewhat easier to operate. P-38 was developed in 1942 and was issued in the canned field rations of the United States Armed Forces.

The P-38 and P-51 are cheaper to manufacture and are smaller and lighter to carry than most other can openers. The device can be easily attached to a key ring or dog tag chain using the small punched hole.

Figure 2.4: P-51 and P-38 Military can opener

Source: Wikipedia, the free encyclopedia (2009)

2.2.5 Electric can opener

The first electric can opener shown in the figure 2.5 was patented in 1931 and modelled after the cutting wheel design. Those opener have been produced in1930 and advertised as capable to remove lids from more than 20 can per minute without any risk injury. Nevertheless they found little success. Electric openers were re-introduced in 1956 by two Californian companies. Klassen Enterprises of Centreville brought out a wall-mounted electric model however this complex design was unpopular too.

The same year, Walter Hess Bodle invented a freestanding device combining an electric can opener and knife sharpener. He and his family members built their prototype in his garage with daughter Elizabeth sculpting the body design. It was manufactured under the Udico brand of the Union Die Casting Co. In Los Angeles and came in the flamingo pink, avocado green and aqua blue colours of the era. These openers were introduced on the market for Cristmas sales and had immediate success.

Figure 2.5: Electrical Can Opener

Source: Wikipedia, the free encyclopedia (2009)

2.2.6 Modern design Can Opener

A new style shown in the figure 2.6 of can opener emerged in 1997. Whereas most other openers cut the can from the top, this one cuts the can from the side, very near its top. The rim is neatly cut in half in the plane of the flat end, leaving half of the rim attached to the can and the other half attached to the flat end. No sharp edges are produced on the lid. The driving teeth are very much finer than those of the classical can opener and reside at the bottom of a V-shaped groove, which surrounds the rim on three sides at the point of action.